An Empirical Assessment Of The EFQM Excellence Model In Purchasing

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ABSTRACT

This study focuses on the important concepts of quality management, internal customer satisfaction, and business performance within the neglected purchasing unit of manufacturing firms on the basis of the European Foundation for Quality Management (EFQM) Excellence Model, thus, filling a void in the existing literature. In doing so, this study tests the viability of the EFQM model in a single functional unit. Three hypothesis were generated based on the EFQM model to identify the specific relationships between purchasing's quality management practices (EFQM enabler), internal customer satisfaction, and business performance (EFQM results). The hypotheses were tested through structural equation modeling based on a sample of 306 purchasing agents within manufacturing. The results indicated that the EFQM seem to be a viable model that represents what impacts implementing QMP enablers will have on the resultants, ICS and OP. Additionally, the results identified that the extent of adoption of quality management purchasing has a direct positive impact on improving internal customer satisfaction and an indirect positive impact on business performance mediated by internal customer satisfaction, as predicted by the EFQM model. This study highlights the positive impact of adoption of EFQM in the purchasing area, thus, lends support to purchasing departments trying to justify the implementation of quality management practices to their administrations. Additionally, it gives upper management, looking for ways to improve the company's bottom line, the specifics to do this through the implementation of quality management practices in purchasing. Management and purchasing departments are given a blueprint for improving their performance.

Keywords: Purchasing; Quality Management; Supply Chain Management; Internal Customer Satisfaction; Business Performance; EFQM Model

1. INTRODUCTION

Pressure on companies to remain profitable in an increasingly complex and competitive global marketplace has attracted managers' attention to supply chain management (SCM). Several authors have argued that the scope of SCM goes beyond the concept of integrated logistics and combines all business processes (Cooper, Lambert, & Pagh, 1997), including quality management (Foster, 2008; Romano & Vinelli, 2001; Talib, Rahman, & Qureshi, 2011), customer relationship management, or, product development and commercialization (D. M. Lambert & Cooper, 2000). To improve companies' competitiveness and efficiencies, numerous frameworks have been proposed (e.g., Malcolm Baldrige National Quality Award (MBNQA) and the European Foundation for Quality Management (EFQM) Excellence Model) to help integrate and improve quality management in firms and their supply chain at the company-wide (macro) level (Bou-Llusar, Escrig-Tena, Roca-Puig, & Beltrán-Martín, 2009). This study applies one of these frameworks, the EFQM model specifically, to the purchasing function (micro) of a company's supply chain.

An effective purchasing function has been considered a key business process in the supply chain (Fawcett & Fawcett, 1995; Giunipero & Brand, 1996; D. Lambert, Cooper, & Pagh, 1998; Sánchez-Rodríguez & Hemsworth, 2005). Purchasing's role is very important as an intermediary in the supply chain, connecting suppliers with purchasing's internal customers who, in turn, provide products and services for the firm's external customers (D. R. Krause, Vachon, & Klassen, 2009; Stanley & Wisner, 2001). Because internal customers play an important role within the supply chain, internal customer satisfaction can also affect organizational performance (Panigyrakis & Theodoridis, 2009; Yu, Qiu, & Feng, 2010). The importance of internal customer satisfaction for a successful purchasing function has also been recognized in the recent literature (Large & König, 2009; van Mossel & van der Valk, 2008). Despite the numerous quality frameworks that have been proposed, adopted, and implemented, researchers (e.g., Bou-Llusar

et al., 2009; Mcadam & Leonard, 2005) have pointed out that there is a paucity of studies examining the effectiveness of these quality models (e.g., EFQM). Although the importance of purchasing and quality management to supply chain success is well known, to date there has been relatively little research regarding quality management practices in purchasing and their effect on internal customer satisfaction and business performance (Brandon-Jones & Silvestro, 2010; Jun & Cai, 2010; Panigyrakis & Theodoridis, 2009). Therefore, the objectives of this paper represent a unique attempt to measure the EFQM model's viability, not to the company as a whole but as applied to a specific functional area, purchasing, due to its strategic importance and value creating nature (Björklund, 2010; Kern, Moser, Hartmann, & Moder, 2012). Additionally, this research empirically examines the EFQM framework by relating the enablers - quality management practices in purchasing - with the results - internal customer satisfaction and the organization's performance measures - all in the purchasing context.

Thus, in this paper the relevant SCM, TQM, purchasing, and EFQM literature is reviewed and associated hypotheses, derived from the EFQM framework, were developed and tested by means of structural equation modeling. The findings extend the understanding of the EFQM model's application to quality management practices in purchasing and the purchasing function's importance to the organization.

2. LITERATURE REVIEW

2.1. TQM Impact on SCM and Operational Performance

The impact of total quality management has been a prominent area of study in SCM. For example, Kuei, Madu, and Lin (2001) concluded that improvements in quality management practices in a supply chain are associated with improvements in organizational performance. Tan, Kannan, Handfield, and Ghosh (1999) examined the impact of TQM, supply base management, and customer relations practices on corporate performance. They concluded that performance improvement is more likely to happen if the company's quality and procurement implementation strategies are congruent with strategies in other business areas such as finance, operations, marketing, new product development, and sales. Salvador, Forza, Rungtusanatham, and Choi (2001) collected data from 164 plants to research whether an organization's interaction with its supply chain partners (suppliers and customers) to manage materials flow and ensure materials quality can improve time-related performance. One of the study's conclusions was that interactions with suppliers for quality management have a positive impact on delivery and operations performance. In a study of Thailand's automotive industry, Vanichchinchai and Igel (2011) identified a positive relationship between TQM and SCM, where TQM practices have a significant direct positive impact on SCM practices and supply performance. It has also been noted that supply chain management and quality management are correlated and positively associated with performance (Kannan & Tan, 2005). Although most studies have identified a positive association between TQM and SCM (e.g., Hsu, Tan, Kannan, & Leong, 2009; Theodorakioglou, Gotzamani, & Tsiolvas, 2006), a recent study by Hsu et al. (2009) on the basis of 455 senior purchasing and operations managers identified a non-significant relationship between TQM capability and SCM practices, where supply chain management practices mediate the impact of operations capability on performance. This study also suggested that quality capability affects firm performance directly. Thus, either directly or indirectly through SCM, research has demonstrated that quality practice implementations can have an impact on firm performance.

2.2. TQM in Purchasing

Arguments for the relationship between quality management in purchasing and performance can be found in the resource-based view of the firm (J. Barney, 1991; J. B. Barney, 1986; Peteraf, 1993). According to this view, a firm can attain a competitive advantage by applying resources and capabilities at the firm's disposal. According to Makadok (2001) "resources are stocks of available factors that are owned or controlled by the organization, and capabilities are an organization's capacity to deploy resources" (Amit & Schoemaker, 1993, p.35). In simple terms it is the bundling of the resources that builds capabilities. As such, quality management could be considered more as a capability rather than a resource.

Giunipero and Vogt (1997) collected data from 85 purchasing managers and analyzed the commitment to empowerment, adoption of TQM and continuous improvement techniques, and the use of different types of teams in the purchasing function. One of the main conclusions of this study was that purchasing can play a key role in employee

empowerment and TQM implementation. Additionally, empirical research in TQM has shown that cross-functional coordination and management commitment are positively correlated with quality performance and service quality (S Curkovic, Vickery, & Droge, 2000; Hemsworth, Sánchez-Rodríguez, & Bidgood, 2008; Yu et al., 2010), and that company performance is positively correlated with personnel management (Carter, Smeltzer, & Narasimhan, 2000; Foster, 2008). Brookshaw and Terziovski (1997) described how "a clearly understood purchasing strategy in alignment with an organization-wide TQM culture and business strategy is expected to intensify the overall delivery of value to the customer" (p. 257). However, as the same authors pointed out, the empirical evidence is minimal. In their work they found significant differences in increased customer satisfaction between companies that had implemented quality-oriented purchasing and those that had not. However, as the same authors pointed out, the scale used to measure the construct of quality-oriented purchasing had limited reliability. In contrast, Caddick and Dale (1998) did not find evidence of a revised role of purchasing in a TQM environment. However, their findings suffered from a lack of scope since they reported empirical evidence from only a single case study.

Studies by Stanley and Wisner (1998; 2001; 2002) and Wisner and Stanley (1999) evaluated the implementation of purchasing activities and cooperative supplier relationships associated with high levels of internal and external quality service (customer satisfaction). Their main conclusion _ENREF_106_ENREF_124was that the purchasing function plays a key role in the integration and communication of quality expectations and the achievement of better quality performance. Purchasing's implementation of supplier quality management has been found to lower materials costs, increase quality of materials, reduce delays in deliveries from suppliers, and eliminate mistakes in quantities ordered and received (Anderson, Rungtusanatham, Schroeder, & Devaraj, 1995; Kaynak, 2003; Lamming, 1993; Noordewier, George, & Nevin, 1990; Vonderembse & Tracey, 1999; Watts & Hahn, 1993). However, the successful implementation of supplier quality management is preceded by the existence of an effective quality information system (Hemsworth et al., 2008; D. Krause, 1999; Lascelles & Dale, 1989). The literature has also suggested that the purchasing function's ability to provide the optimum service to its internal customers is influenced by suppliers' performance levels (Large & König, 2009; Stanley & Wisner, 2001; Wisner & Stanley, 1999). More recently, studies by Sánchez-Rodríguez and Hemsworth (2005) and Harsasi and Radhi (2010) identified a significant positive relationship between quality management practices in purchasing and purchasing performance. Thus, there is building support in the literature for the fact that quality management practice implantations result in an increase in purchasing performance

2.3. TQM's Impact on Internal Customer Satisfaction and Operational Performance

A recent study by Vanichchinchai and Igel (2009) on TQM and SCM indicated that although TQM has an internal focus while SCM has an external focus, they both share the common goal of customer satisfaction. While TQM's focus is internal, the bulk of the literature attends to external as opposed to internal customer satisfaction (Stanley & Wisner, 2001). As such "there is a need to emphasize both internal and external partnerships to further strengthen the emphasis on "total" TQM and the entire supply chain in SCM" (Vanichchinchai and Igel, 2009, p. 249). In addition, a study by Fredendall, Hopkins, and Bhonsle (2005) highlights the importance of internal customer satisfaction by noting that through both internal and external customers, organizations can "understand the firm's requirements and effectively communicate these requirements to the supplier" (p. 26). Studies by Hult, Ferrell, Hurley, and Giunipero (2000) and Pfau, Detzel, and Geller (1991) suggest that organizational orientation toward internal customers is linked to external customer satisfaction. Furthermore, internal customer orientation leads to improved performance, supply chain management, and external and internal marketing Mohrw-Jackson, 1991; Panigyrakis and Theodoridis, 2009; Yu et al., 2010). On achieving internal customer satisfaction, it has been noted that internal service quality leads to internal customer satisfaction (Jun & Cai, 2010). In addition, quality management practices in purchasing are associated with purchasing's operational performance and internal customer satisfaction (Sánchez-Rodríguez, Hemsworth, & Martínez-Lorente, 2004). However, these studies failed to test the effect of quality management practices in purchasing on the people who the purchasing function serves and the resulting impact this has on the firm's performance.

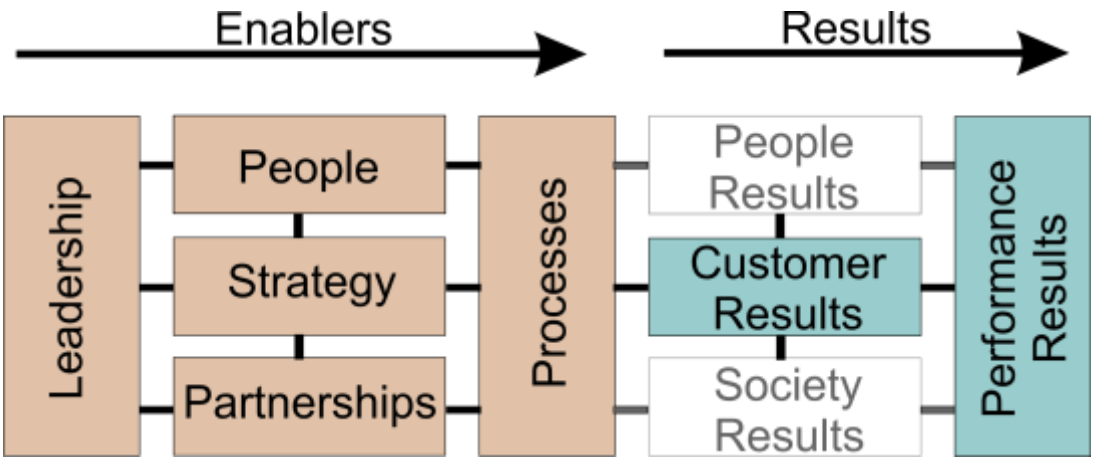
2.4. TQM and the Evolution of EFQM

An important evolution of TQM adoption is the introduction of systematic approaches to quality management such as the quality awards including the Deming Prize (DP Model) in Japan, the Malcolm Baldrige National Quality Award

(MBNQA) Model in the USA, and the European Quality Award (EFQM Excellence Model) as well as the criteria for company self-assessment (Ojanen, Piippo, & Tuominen, 2002). The TQM principles and their impact on different aspects of the firm are the pillars on which the models of excellence rest. They also serve as the foundation on which companies have established a philosophy of managing for success in the long term and a strategy to improve performance. However, there has been only limited work that empirically examines the impact of models on companies (e.g., Bou-Llusar et al., 2009; S. Curkovic, Shawnee, & Droge, 2000). Thus, more research must be conducted to understand the full implications these models can have on improving quality management implementations and to determine whether these models can be applied to individual business functions within the firm.

In 1988, the European commission prompted the creation of a non-profit and membership-based organization called the European Foundation for Quality Management (EFQM) whose aim was to come up with a representation of TQM theory that is implementable in all types of organizations. The resulting EFQM model (see Figure 1) is an advanced tool for organizational improvement inspired by the principles of Total Quality Management (TQM). In fact, agents in the EFQM model coincide with many of the elements included by different authors as critical factors in TQM (Flynn, Sakakibara, & Schroeder, 1994; Saraph, Benson, & Schroeder, 1989; Svensson & Klefsjo, 2000). This model is based on managing the organization through a set of interdependent and interrelated systems, processes, and facts. It is a non-prescriptive management framework that is widely used by over 30,000 public and private sector organizations in the world. It can be used to gain a holistic overview of any organization and helps managers to identify the main aspect to be improved for attaining excellence (Zink, 1995).

Figure 1. EQFM Model



The EFQM model is composed of two major components: enablers and results. The enabler components include what an organization does in order to achieve excellence and involve five dimensions: leadership, people, strategy, resources, and processes (see Appendix 1 for details). All five enabler components are examined in this paper. The results aspect is composed of four firm-beneficial outcomes: people, customer, society, and performance (only the customer and performance results are examined here, society and people results were beyond the scope of the dataset). Some empirical work supports the existence of interrelationships among the enabler criteria of the model (Bou-Llusar, Escrig-Tena, Roca-Puig, & Beltrán-Martín, 2005) showing that each are linked together in a very complex structure that makes it very difficult to discern each separately. According to this interpretation of the enabler side of the EFQM model, changes in one dimension are related to changes in other dimensions, and there is therefore a reciprocal interdependence between all enabler components.

A review of the literature quickly uncovers a large volume of studies on applying this model within various contexts (e.g., Hides, Davies, & Jackson, 2004; Samuelsson & Nilsson, 2002; Shaw, 2000; Wongrassamee, Simmons, & Gardiner, 2003). These studies have a holistic macro approach to quality management and focus on organizational-wide application of the EFQM model. An exception applies to a few studies that focus on the application of an EFQM

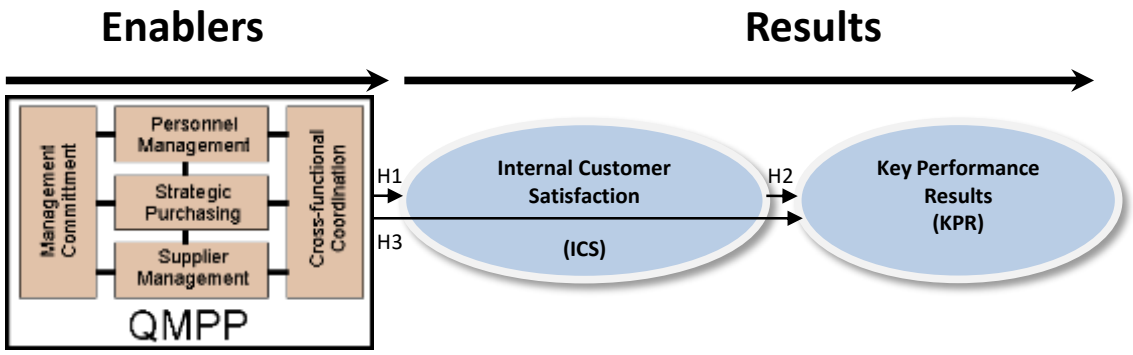
model within a section or department of an organization. For example, research conducted by Sanchez-Rodriguez, Martinez-Lorente, and Hemsworth (2012) focused on the impact of the EFQM model on adoption of e-procurement and performance. Other studies integrate the EFQM model and information systems (Sadeh, Arumugam, & Malarvizhi, 2013) and customer-relationship-management systems (Reihanifard, Aminilari, Moghadam, Vahdat, & Mozaffari, 2012) among SMEs. Another study focuses on application and assessment of customer focus based on the EFQM model within a local government (Jacobs & Suckling, 2007).

Much of the literature has focused on the impact of individual criteria or linkages and does not allow for an assessment of the entire set of EQFM enablers on the model's resultants (Bou-Llusar et al., 2009). Thus, this paper contributes by examining: 1) the micro application (opposed to the traditional macro/organizational level) of the EFQM model to a specific functional area (i.e., purchasing), by operationalizing the five EFQM enablers of quality management (i.e., personnel management, cross-functional co-ordination, and strategic purchasing) and resultant factors (internal customer satisfaction and business's performance) to the purchasing domain, 2) on the basis of testing the EFQM model, the impact of the enabler factors (quality management practices in purchasing) on the resultant factors — internal customer satisfaction and performance. Consequently, this paper allows us to assess the viability of using the EFQM framework to guide the implementation of contemporary quality management practices in purchasing (EFQM - enablers), and determining their impact on internal customer satisfaction (EFQM - result) and performance (EFQM - result) as well as demonstrating the micro (functional) application of the EFQM model.

3. THEORETICAL FRAMEWORK AND HYPOTHESES

Figure 2 presents the theoretical framework for the operationalization of the EFQM model (Figure 1) to the purchasing function. This model forms the basis for this research study. The EFQM enablers (left side of the EFQM model in Figure 1) are represented in Figure 2 by the contemporary implementation of the quality management practices in purchasing (see Table 1 for details). The EFQM results pertaining to customers (middle section of Figure 1) are represented in Figure 2 by the measurement of the purchasing department's internal customers' satisfaction. The EFQM final performance results (right-most side of Figure 1) are represented by Figure 2's business performance results. Note that only the shaded areas in Figure 1, excluding the EFQM results pertaining to the personnel and society (these are beyond the scope of the current study), are tested in the model presented in Figure 2.

Figure 2. Theoretical Framework — Operationalization of the EFQM model for the purchasing function



There are three constructs and three relationships portrayed in Figure 2's theoretical model. As we discussed in the literature review, overall there is consistent support in the literature for a positive relationship between quality management, customer satisfaction, and the overall company's operational performance (e.g., Anderson, Rungtusanatham, & Schroeder, 1994; Choi & Eboch, 1998; S. Curkovic et al., 2000; Dean & Bowen, 1994; Kannan & Tan, 2005). Therefore, it would be reasonable to assume that the implementation of quality management purchasing would be related with internal customer satisfaction and key business performance results. Measurement and operationalization of each of the constructs is discussed below.

3.1. Quality Management Practices in Purchasing and the EFQM Enabler Construct (QMPP)

As we mentioned earlier, the EFQM enabler construct is composed of five components (see Figure 1) that are linked together in a very complex structure where changes in one dimension relate to changes in other dimensions with all enabler components having a reciprocal interdependence, thereby making individual impacts difficult to discern (Bou-Llusar et al., 2009). Based on these elements and using the purchasing function as the unit of analysis, a similar set of key elements where mapped onto the EFQM framework to define quality management enablers for purchasing as seen in Figure 2 and Table 1. The following five salient factors define quality management purchasing: supplier quality management, personnel management, cross-functional coordination, management commitment, and strategic purchasing. These five factors together measure the QMPP construct. The methods and structure of the QMPP construct are similar to the Enabler Excellence construct used by Bou-Llusar et al. (2009) in their seminal work "An empirical assessment of the EFQM Excellence model."

A brief description of each EFQM factor, the associated purchasing factors, and selected literature that supports and describes it is presented in Table 1.

Table 1. Operationalization and Mapping of the EFQM Enabler Construct in the Quality Management Purchasing Content

EFQM	Operationalized in Purchasing	Description	Selected literature
Leadership	Management commitment (MC)	Purchasing management committed to total quality	Ahire, Golhar, and Waller (1996), Anderson et al. (1994), Black and Porter (1996), S Curkovic et al. (2000), Flynn et al. (1994), Hemsworth et al. (2008), Powell (1995), Saraph et al. (1989)
Strategy	Strategic Purchasing (SP)	Evaluation and improvement of the company's purchasing process and performance by analyzing other organizations' purchasing process and performance	Ahire et al. (1996), Black and Porter (1996), Camp (1989), A. Carr and Smeltzer (1999), Powell (1995), Hackman and Wageman (1995)
People	Personnel management (PM)	Management of employees based on empowerment, training, teamwork, performance evaluation, and reward and recognition	Ahire et al. (1996), Anderson et al. (1994), Black and Porter (1996), Carter and Narasimhan (1994), Carter, Smeltzer, and Narasimhan (1998), Carter et al. (2000), S Curkovic et al. (2000), Flynn et al. (1994), Jiménez-Jiménez and Martínez-Costa (2009), Perdomo-Ortiz, González-Benito, and Galende (2009), Powell (1995), Saraph et al. (1989), Youndt, Snell, Dean, and Lepak (1996)
Partnerships	Supplier quality management (SQM)	Establishment of cooperative relationships with suppliers and enhancement of suppliers' capabilities to improve quality	Carter and Narasimhan (1994), Carter et al. (1998), A. S. Carr and J. N. Pearson (1999), Dowlatshahi (1998), Dyer (1997), Ellram and Hendrick (1995), Foster (2008), Flynn et al. (1994), Kaynak and Hartley (2008), D. Krause (1999), D. Krause, Scannell, and Calantone (2000), Lascelles and Dale (1989), Powell (1995), Saraph et al. (1989), Stuart and Mueller (1994), Trent and Monczka (1999)
Processes	Cross-functional coordination (CFC)	Coordination with other functional areas in the company to improve quality	Anderson et al. (1994), Burt (1989), Carter and Narasimhan (1994), Carter et al. (1998), A. S. Carr, Kaynak, and Muthusamy (2008), Dean and Bowen (1994), Giunipero and Vogt (1997), Yu et al. (2010)

3.2. Purchasing's Internal Customer Satisfaction EFQM Result Construct (ICS)

The EFQM model measures customer satisfaction as one of its result components. In the purchasing department context, the customers are the department/individuals within the company for whom materials or services are purchased and thus are referred to as the internal customer. Several studies in the literature have used the concept of service quality to evaluate internal customer satisfaction levels (Jun & Cai, 2010; Stanley & Wisner, 1998; 2001; 2002; Young & Varble, 1997). A widely used instrument to measure customer satisfaction has been the SERVQUAL questionnaire developed by Parasuraman, Zeithaml, and Berry (1985) and Parasuraman, Zeithaml, and Berry (1988). Accordingly, customer satisfaction was operationalized following the set of service quality dimensions identified by Parasuraman et al. (1985) and Parasuraman et al. (1988), namely reliability (the ability of the purchasing department to perform the promised service dependably and accurately), responsiveness (the willingness of the purchasing department to help internal customers and provide prompt service), assurance (the knowledge and courtesy of the purchasing department's employees and their ability to convey trust and confidence), empathy (the caring, individualized attention the purchasing department provides to customers), and tangibles (the appearance of the purchasing department's physical facilities, equipment, personnel, and communication material). Although some authors have argued that performance-based measures are more effective for evaluating service quality than SERVQUAL (e.g., Cronin & Taylor, 1994; Teas, 1994), a recent review of twenty years of SERVQUAL research by Ladhari (2009) revealed that SERVQUAL remains useful for service quality research. The SERVQUAL model was chosen as the measurement tool for this investigation because it is widely used for research and provides the breadth and accuracy to capture the complexities of the internal customer satisfaction construct. Future research could attempt to compare and contrast these two models by incorporating performance-based measures into this construct's operationalization.

3.3. EFQM Key Performance Results Construct (KPR)

The final result component of the EFQM model involves key performance results. In the purchasing department context, the performance results are reflected in the organization's business performance measures. Research has shown that to effectively capture a firm's performance, organizations should measure performance in multiple dimensions (Kaplan & Norton, 2001) to include measures of both internal and external performance. This construct is composed of four indicators of a company's overall effectiveness. It corresponds to external and internal measures and was based on work done by Azadegan and Pai (2008). These measures consist of the external measures: return on assets (A. Carr & Smeltzer, 1999; S. Curkovic et al., 2000; Tan et al., 1999), return on sales (Tan et al., 1999), and market share (e.g., A. Carr & J. Pearson, 1999; S Curkovic et al., 2000; Tan et al., 1999) and internal measure: production costs (e.g., Narasimhan & Das, 1999; Tan et al., 1999). Therefore the operationalization of the EFQM performance construct includes multiple key performance indicators—both internal and external measures.

3.4. Hypotheses

A fundamental premise in TQM literature is that the introduction of a TQM initiative leads to improved company performance and competitiveness. This premise is adopted by the EFQM Excellence Model which claims that "excellent results with respect to performance, customers, people and society are achieved through leadership driving policy and strategy, which is delivered through people, partnerships and resources, and processes" (EFQM, 2005). In short, quality management purchasing should correlate positively with key performance results; otherwise there will be little company interest in its implementation. Based on this premise and the general EFQM model presented in Figure 1, as well as the model presented in Figure 2 where the purchasing specific enablers and resultants are mapped onto the general EFQM model, the following hypotheses were developed.

H1: Quality management practices in purchasing have a significant direct positive relationship with internal customer satisfaction.

H2: Internal customer satisfaction has a significant direct positive relationship with the key performance measures.

H3: Quality management practices in purchasing have a significant indirect (mediated) positive relationship with business's key performance measures via internal customer satisfaction.

4. METHOD

4.1. Sample Description

The EFQM European quality management model is widely utilized in Spain and in countries with similar economies. Spain's economy has been identified as the fifth largest in the EU (E.C., 2012) with manufacturing identified as one of the country's main sectors (B.C.S.S.L., 2011). According to Sánchez and Mora (2002) Spain has similar industrial policies to other EU countries, Spain is a good representation of southern nations of the EU (Spain, Italy and Greece) if not all the EU countries (PewResearch, 2013). As such the importance of Spain in representing the EU is reflected by the number of studies on the EFQM model in this context such as studies of adaptation of EFQM model to health care (Lorenzo et al., 1999), total quality management in urban hotels (Soriano, 1999), EFQM model criteria (Calvo-Mora, Leal, & Roldán, 2005), quality management models and company results (Heras Saizarbitoria, 2006), total quality management and performance (Santos-Vijande & Alvarez-Gonzalez, 2007) and quality management and quality outcome (Tari, Molina, & Castejon, 2007). A similar study by Bou-Llusar et al. (2009) evaluating the EFQM excellence model relative to the MBNQA model was similarly conducted using manufacturing in Spain (this study did not apply to purchasing). Nevertheless, there is little research on the EFQM model within the purchasing unit in the context of the Spanish manufacturing sector. On the basis of the above, this study focuses on Spanish manufacturers.

The sample frame consisted of 1,200 purchasing managers who were selected (convenience sampling) from the Dun and Bradstreet database (informa.es) of the largest manufacturing companies in Spain. Purchasing managers were determined as the most appropriate respondents because they are most familiar with their organization's purchasing practices and performance outcomes. The survey was administered in three mailings following a modified version of *Total Design* (Dillman, 1978) for survey research. In the first mailing, a cover letter explaining the purpose of the study and a survey questionnaire along with a postage-paid envelope were sent to all members in the sample frame. A letter encouraging non-respondents to participate in the research was sent three weeks later. Six weeks after the initial mailing, a second survey and cover letter were sent to the remaining non-respondents. The respondent sample was composed of high-level purchasing executives, including 145 directors of purchasing (48%), 89 general managers of purchasing (29%), 19 purchasing managers (6%), and 45 "other" titles (17%).

Of the 1,200 surveys mailed, eight were returned undeliverable. Three hundred and six usable responses were received, which translates into a 25 percent response rate. Two approaches were used to assess non-response bias. The first approach consisted of comparing early with late respondents following Armstrong and Overton (1977) recommendations. No significant differences were found between early and late respondents on such variables as sales volume, number of employees, or cost of raw materials and components. The second approach involved comparing sales and number of employees between responding firms and non-responding firms (see Table 2). Because no significant differences were found between the two sample groups, the respondent group's sample considered similar to the targeted industries.

Respondents reported an average of 779 employees. Fifty percent of the companies employed between 101 and 500 employees (155 firms). The largest firm employed 15,000 workers and had the highest annual sales (€5.4 billion). A diverse group of manufacturing organizations participated in the study. In descending order of response frequency, food, automotive components, miscellaneous manufacturing, and chemicals were the most widely represented industries in the respondent group (see Table 3). Annual gross sales of the companies surveyed ranged from 34 million Euros (€) to €5.4 billion, with an average annual sales of €141 million.

Table 2. Comparisons Between Respondents and Non-respondents (Dun & Bradstreet Database)

		n	Mean	Standard deviation	Significance
Sales (million Euros €)	Non-respondents	898	169.38	514.11	0.383
	Respondents	302	141.61	349.83	
Number of employees	Non-respondents	890	536	1,024	0.637
	Respondents	302	568	932	

Table 3. Respondents' Industries as Reported in the Sample

Industry	Frequency	Percentage
Food and beverage	58	18.9%
Auto components	46	15.0%
Miscellaneous manufacturing	40	13.4%
Chemicals	38	12.4%
Machinery	20	6.5%
Pharmaceutical products	15	4.9%
Construction materials	14	4.6%
Telecommunications & electronic equipment	12	3.9%
Electricity materials	12	3.9%
Primary metals	12	3.9%
Paper	11	3.6%
Electric appliances	10	3.3%
Non-ferrous metallurgy	9	2.9%
Textile	9	2.9%
Total	306	100.0%

4.2. Scale Development

A list of quality management purchasing activities was compiled based on the literature reviewed as depicted in Table 1. Operations management faculty were used as expert judges for content validation to determine how well the chosen items represented the defined constructs. Purchasing managers at five manufacturing sites were interviewed while they reviewed the variables and items included in the survey questionnaire to identify any language ambiguities and perceived omissions of other relevant practices not included in the survey. There were no significant variables missing in the pilot study questionnaire but only minor wording discrepancies and comments which were then used to further refine the survey instrument.

The survey instrument measured 23 items related to quality management purchasing (see Table 4), four items related to business performance, and five items related to internal customer satisfaction (see Table 5). In order to measure those items, respondents were asked to indicate their degree of agreement or disagreement with the listed statements using five-point labeled Likert scales, where one represented "strongly disagree" and five represented "strongly agree." For example, for item V1 in Table 4, pertaining to predominance of quality over other purchasing objectives, the question in the survey instrument was, "Indicate your agreement or disagreement with the following statement: Purchasing management communicates to purchasing employees that quality is the most important purchasing objective."

Table 4. Scale Development Quality Management Purchasing CFA Loadings

	Construct / Item	Standardized coefficient**	*t*-value	*p-value*
	Management commitment (MC) α = 0.71			
V1	Predominance of quality over other purchasing objectives	0.793	13.112	0.000
V2	Purchasing management's evaluation based on quality	0.633	10.465	0.000
V3	Predominance of quality in supplier selection and evaluation	0.569	9.336	0.000
	Cross-functional coordination (CFC) α = 0.69			
V4	Purchasing's interaction with quality	0.600	9.603	0.000
V5	Purchasing's interaction with production	0.741	11.814	0.000
V6	Purchasing's interaction with new product development	0.600	9.594	0.000
	personnel management (PM) α = 0.75			
V7	Job autonomy	0.478	8.040	0.000
V8	Job security	0.636	11.282	0.000
V9	Involvement in decisions	0.517	8.805	0.000
V10	Training	0.666	11.944	0.000
V11	Teamwork	0.695	12.605	0.000
V12	Reward and recognition	0.483	8.138	0.000
	Supplier quality management (SQM) α = 0.76			
V13	Certification of suppliers under ISO 9000	0.430	7.195	0.000
V14	Supplier evaluation	0.713	13.169	0.000
V15	Supplier reward and recognition	0.558	9.695	0.000
V16	Training for suppliers	0.609	10.783	0.000
V17	Supply base rationalization	0.206	3.317	0.000
V18	Sharing of information	0.677	12.320	0.000
V19	Interaction with suppliers in materials improvement	0.688	12.572	0.000
	Strategic Purchasing (SP) α = 0.80			
V20	Purchasing involvement in strategic planning process	0.512	8.74	0.000
V21	Purchasing long-term planning	0.868	10.53	0.000
V22	Level of purchasing manager in organization	0.695	11.00	0.000
V23	Alignment of purchasing and company strategy	0.735	11.56	0.000

Table 5. Scale Development Measurement Model CFA Results

	Construct / Item	Standardized Coefficient**	*t*-value	*p*-value
	Quality management practices in purchasing (QMPP) α = 0.73			
CV1	Management commitment (MC)	0.49	8.07	0.000
CV2	Cross-functional coordination (CFC)	0.49	8.05	0.000
CV3	Personnel management (PM)	0.80	14.01	0.000
CV4	Supplier quality management (SQM)	0.63	10.77	0.000
CV5	Strategic Purchasing (SP)	0.62	10.63	0.000
	Business performance (BP) α = .76			
V24	Return on Assets (Profit / total assets)	0.47	8.05	0.000
V25	Sales margin (Profit / Sales)	0.65	12.85	0.000
V26	Production costs	0.80	17.33	0.000
V27	Market share	0.82	19.12	0.000
	Internal customer satisfaction (ICS) α = 0.69			
V28	Reliability	0.45	7.25	0.000
V29	Empathy	0.71	12.48	0.000
V30	Assurance	0.43	7.038	0.000
V31	Responsiveness	0.76	13.43	0.000
*	Tangibles	-	-	-

*Item dropped during validity and reliability analyses; **Standardized loadings are calculated from the confirmatory factor analyses performed on each scale/subscale (not the model tested in Figure 3).

5. RESEARCH RESULTS

5.1. Analyses

Data were initially entered into Microsoft Excel 2003 and then Excel 2010 for preprocessing, data cleansing, and determination of scale composites. Pairwise deletion, rather than mean substitution, was employed for missing data. IBM SPSS Version 19 (IBM, 2010)was then used for the statistical analyses and Lisrel 8.8 (K. G. Jöreskog & Sörbom, 2006) for the confirmatory factor analyses and structural equation modeling (SEM). Confirmatory factor analyses (CFA) were conducted on all scales and subscales. All tests were two-tailed, and the level of significance was set at .05, so *p*-values α=.05 were reported as statistically significant unless otherwise specified. The model and hypotheses were tested using SEM. SEM is an appropriate statistical technique when assessing the relationships among latent constructs that are measured by multiple scale items, where at least one construct is both a dependent and an independent variable (Hair, Anderson, Tatham, & Black, 1995).

5.2. Construct Validation

Confirmatory factor analysis (CFA) was conducted to address the reliability and validity of the study's constructs (Anderson & Gerbing, 1988). We first examined the convergent validity of all constructs utilized in this study through a confirmatory factor analysis. Multiple-fit criteria were used to assess the appropriateness of the measurement models tested (Bollen & Long, 1993; Hair et al., 1995).

Convergent validity is demonstrated when a set of alternative measures accurately represents the construct of interest (Churchill, 1979). For this study, convergent validity was assessed by reviewing the level of significance for the factor loadings. If all the individual item's factor loadings are significant, then the indicators are effectively measuring the same construct (Anderson & Gerbing, 1988). For each of the three constructs the CFAs indicated a good fit; QMPP -- $\chi^2 = 7.72$, $p = 0.05$, $df = 9$, $\chi^2 / df = 0.85$, RMSEA = 0.05, RMSR = 0.04, CFI = 1.00, GFI = 0.99, AGFI = 0.96; ICS -- $\chi^2 = 2.01$, $df = 2$, $p = 0.05$, $\chi^2 / df = 1.0$, RMSEA = 0.05, RMSR = 0.04, CFI = 1.00, GFI = 0.99, AGFI = 0.96; BP -- $\chi^2 = 0.01$, $df = 1$, $p = 0.93$, $\chi^2 / df = 0.01$, RMSEA = 0.00, RMSR = 0.00, CFI = 1.00, GFI = 1.00, AGFI = 1.00.

The fit indices for the CFA showed values above or equal to the recommended minimum levels ($p >= 0.05$, $\chi^2 / df < 3.0$, RMSEA < 0.10, RMSR < 0.10, CFI > 0.90, GFI > 0.90, AGFI > 0.90). As can be seen in Table 4 and Table 5, the coefficients for all indicators were high and strongly significant (*t*-values > 2.576; $p < 0.01$). These results provide satisfactory evidence of convergent validity for the indicators used to measure the constructs in this study.

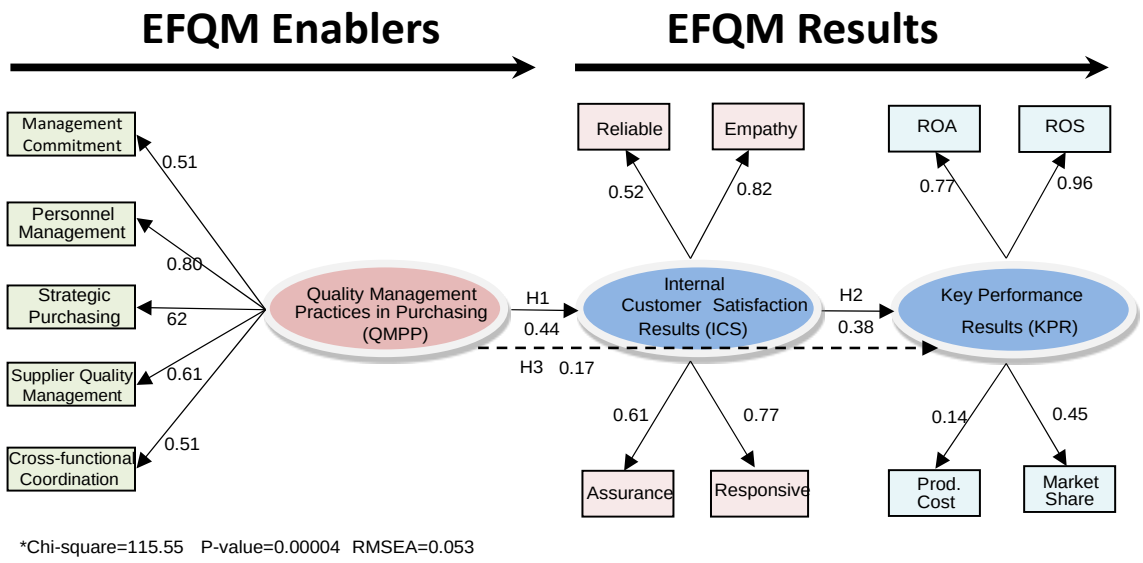
Discriminant validity among the latent variables and their associated measurement variables can be assessed by fixing (i.e., constraining) the correlation between pairs of constructs to 1.0, then re-estimating the modified model (Segars & Grover, 1993). This procedure essentially converts a two-construct model into a single-construct model. The condition of discriminant validity is met if the difference of the chi-square statistics between the constrained and standard models is significant (1 df). The chi-square difference tests indicated that discriminant validity exists among all of the constructs that make up the quality management practices in purchasing (SQM, PM, CFC, MC, and SP) ($p < 0.01$). Discriminant validity also exists between the constructs of QMPP, information systems, and business performance.

Scale reliability provides a measure of the internal homogeneity of the items comprising a scale (Churchill, 1979) and was calculated as follows: (square of summation of factor loadings) / [(square of summation of factor loadings) + (summation of error variances)] (Fornell & Larcker, 1981; Hair et al., 1995). With the exception of only cross-functional coordination, all quality management purchasing constructs displayed composite reliability values in excess of 0.70 (see Table 4), and all were above the recommended minimum of 0.60 for exploratory studies (Churchill, 1979), providing enough evidence of the reliability of the scales used. We aggregated the scores for all five quality-management constructs by calculating the average of the individual scores for the items making up each construct, and thus obtained the composite variables CV1 to CV5 (see Figure 2). For example, the mean of the responses from manifest variables V1 to V3 was computed to determine the composite measure for management commitment (CV1).

5.3. Hypothesis Testing

The hypotheses were tested using structural equation modeling (SEM) as depicted in Figure 3. SEM is an appropriate statistical technique when assessing the relationships among latent constructs that are measured by multiple scale items, where at least one construct is both a dependent and an independent variable (Hair et al., 1995). For this reason, we tested the study's hypotheses using structural equation modeling.

Figure 3. Results from the Structural Model Analysis



All values in the model were significant $p<.01$

Prior to assessing the study's hypotheses, the model's overall fit must be established (Bollen & Long, 1993). The chi-square statistic was significant ($\chi^2 = 115.55$; $df = 62$; $p = 0.00004$). However, the chi-square estimate has been shown to be oversensitive to small model discrepancies when sample sizes are larger than 200, or when the model contains a large number of variables (i.e., the model is complex) (Bagozzi & Yi, 1988; Byrne, 1994; Hair et al., 1995). With respect to this oversensitivity, Hair et al. (1995) suggest using the whole data set to estimate the correlation structure and to set the number of observations used to estimate the significance of χ^2 to 200 (this is achieved in LISREL by setting the "N=" portion of the "Data" line to 200). Utilizing this procedure yielded a non-significant $\chi^2 = 75.39$, $p = 0.12$, which indicates a good model fit. The fit indices indicated a good fit between the data and the model. The ratio χ^2 / df (106.58 / 62) and RMS, with values of 1.87 and 0.068, respectively, were below the recommended maximum of 3.00 and 0.10 (Chau, 1997). Similarly, the index RMSEA was below the 0.10 minimum acceptable level, with a value of 0.053. Additionally, the indices NNFI, CFI, IFI, and GFI were all above the minimum acceptable 0.90 level, with values of 0.95, 0.96, 0.96, and 0.94, respectively. The CN exceeded the critical value of 200 at 236.89. The results of the structural model estimation are shown in Figure 4. The model appears to fit reasonably well (Martínez-López, Gázquez-Abad, & Sousa, 2013).

The test of the proposed hypotheses is based on the direct and indirect effects of the structural model presented in Figure 3. LISREL coefficients between latent variables give an indication of the relative strength of each relationship (K. Jöreskog & Sörbom, 1993). Each of the three hypotheses was tested at the significance level $p < 0.05$. All 13 measurement variables loaded significantly ($p < 0.05$) on their respective constructs (QMPP, ICS, and BP).

The first hypothesis asserts that *quality management practices in purchasing have a positive direct relationship with internal customer satisfaction*. According to the results shown in Figure 2, the path relating these two constructs was positive and significant (standardized γ_1 coefficient = 0.44; t-value = 4.73; $p < 0.05$). This provides strong evidence supporting hypothesis 1 and indicates that the adoption of quality management practices in purchasing increases the

level of internal customer satisfaction. This supports Jun and Cai (2010)'s research the positive relationship between internal service quality and internal customer satisfaction.

The second hypothesis posits that *internal customer satisfaction has a positive direct relationship with business performance*. According to the results shown in Figure 2, the path between quality management purchasing and internal customer satisfaction was positive and significant (standardized $\gamma 2$ coefficient = 0.38; *t*-value = 2.18; $p < 0.05$). This provides strong evidence supporting hypothesis 2 and indicates that increases in internal customer satisfaction directly increase the level of business performance. This supports research that suggests internal customer orientation leads to improved performance, supply chain management, and external and internal marketing (Panigyrakis & Theodoridis, 2009; Yu et al., 2010).

The third hypothesis asserts that quality management practices in purchasing have a positive indirect (mediated) relationship with business performance via internal customer satisfaction. According to the results shown in Figure 3, the path relating these two constructs was positive and significant (standardized $\beta 1$ coefficient = 0.17; t-value = 2.37; $p < 0.05$). This provides strong evidence supporting hypothesis 3. This result indicates that when we adopt quality management practices in purchasing, the level of business performance is also expected to improve not directly but indirectly, as mediated by internal customer satisfaction. This confirms Sánchez-Rodríguez et al. (2004)'s study that indicates quality management practices in purchasing are associated with purchasing's operational performance and internal customer satisfaction

Therefore, this research provides strong support for the theoretical model (Figure 2) explored here and the viability of the EFQM model used as a framework to describe the relationship between quality management practices in purchasing with both the purchasing's internal customers and the company's business performance.

6. DISCUSSION AND CONCLUSION

This is the first study to test the multidimensional structure of the EFQM model as applied to the purchasing function using structural equation modeling to examine the relationships among quality management in purchasing, internal customer satisfaction, and performance. Thus this study represents a unique contribution to the literature by 1) establishing and assessing the viability of the EFQM framework to an individual (micro) functional area (i.e., purchasing) as opposed to the traditional macro/organizational level, and 2) examining relationships as hypothesized by the EFQM model among EFQM – enablers (quality management practices in purchasing) and EFQM – results (internal customer satisfaction and key performance results).

With respect to establishing and assessing the viability of the EFQM model for the purchasing function, we first operationalized and applied the five EFQM enablers and two EFQM resultant factors to the purchasing domain. The enablers within the purchasing domain were operationalized as five quality management practices in purchasing - that is, personnel management, cross-functional coordination, and strategic purchasing; as well as two resultant factors, internal customer satisfaction and key performance measures. Confirmatory factor analyses (CFA) were conducted on all the scales and subscales utilized in the model. The results provide strong evidence of the reliability and convergent validity for all the constructs and the associated indicators used in the study. Further, the analysis indicates that discriminant validity exists among all of the constructs in the model— that is, quality management practices in purchasing (including all its subscales), internal customer satisfaction, and key performance results. Finally, the purchasing operationalized EFQM model's overall fit was established indicating that the hypothesized EFQM model fit the purchasing data reasonably well. These results therefore establish the viability of the EFQM framework for an individual (micro) functional area (i.e., purchasing).

Next, the three hypotheses implied by the EFQM model were tested. More specifically the relationship between the EFQM enablers (quality management practices in purchasing) and EFQM results (internal customer satisfaction and key performance results) were estimated using structural equation modeling. First, it was found that the EFQM enablers (the five quality management practices in purchasing) had a significant direct positive relationship with improving the EFQM customer satisfaction resultant (purchasing's internal customer satisfaction). This finding is consistent with other findings in the literature such as that of Jun and Cai (2010) who found that internal service quality leads to internal customer satisfaction. Second, the study found that an EFQM enabler (purchasing's internal customer

satisfaction) had a significant direct positive relationship with key performance results (increasing return on assets, return on sales, production costs, and market share). These findings are consistent with other findings in the literature (Harsasi & Radhi, 2010; Stanley & Wisner, 1998, 2001, 2002) (EFQM, 2005; Harsasi & Radhi, 2010; Stanley & Wisner, 1998, 2001, 2002). Finally, the study identifies quality management practices' positive relationship with purchasing on key performance results as mediated by internal customer satisfaction. This finding demonstrates that the implementation of quality management practices in purchasing leads to an improvement in the company's internal customer satisfaction, which in turn improves the key success performance indicators of the organization. Thus the theoretical implications of the EFQM model proposed in Figure 2 was established for the purchasing function which fills a gap between theory and practice that had been previously overlooked in the literature (Brandon-Jones & Silvestro, 2010; Jun & Cai, 2010).

The study's findings have both practical and theoretical implications. Managers in the purchasing area seeking to improve their performance by adopting quality management practices such as the EFQM model now have empirical research to demonstrate a positive relationship with key business success indicators, which will aid in making their case to upper management for the associated resources. Additionally, this research is of great importance to upper management who are attempting to improve their company's performance in that they can implement the EFQM model in purchasing and potentially other functional areas within the firm to gain positive results. These findings give them a concrete set of quality management practices that they can implement which will have positive impacts on their company's bottom line.

With respect to theoretical implications, the study raises several important questions and opportunities for future research. First, can the EFQM model be operationalized and applied to other functions beyond the purchasing domain? Second, and perhaps more specific to the purchasing function, would the implementation of the EFQM model help the purchasing function to achieve a more recognized role in the company and increase its strategic importance? Although this paper does not specifically address whether or not the role of the purchasing department would change with the application of the EFQM model, it provides some indications of what those changes would be in the event of change. For example, by reason of the purchasing management being involved in the company's overall planning process (strategic purchasing), managing strategic supplier relationships collaboratively (supplier relationships), focusing on team work (purchasing personnel), close coordination of activities with other business functions (cross-functional coordination), and benchmarking, the purchasing function procurement would strengthen the purchasing function's strategic role.. Additionally, recent research predicts (Rozemeijer, Quintens, Wetzels, & Gelderman, 2012) that partnerships, collaborations, and social networks (supported by the EFQM model) will continue to increase in importance both externally with suppliers and internally with internal stakeholders, engaging them to support the business strategy and increase customer value and organizational performance. The EFQM model applied to purchasing identifies the key enabling elements that are necessary to develop these partnerships/networks while at the same time focusing on the outcomes of these enablers, including customer results (internal and external) and financial performance results (Rozemeijer et al., 2012). As such, this study points towards a purchasing department as a strategic business process and centered with a special emphasis in sustained supply chain relationships (Tassabehji & Moorhouse, 2008).

While this study makes important contributions, it has several limitations and opens up many additional opportunities for future research. This study was cross-sectional and descriptive of a given sample at a given point of time. A more stringent test of the relationships between quality management purchasing, internal customer satisfaction, and performance requires a longitudinal study or field experiment that could gather information about quality management purchasing, internal customer satisfaction, and performance in an appropriate time span. Then the association between the variation of independent factors and the variation of performance could be further investigated. Also, the use of a single key informant could be seen as a potential limitation of the study, and this study's findings should be confirmed in the future using information directly obtained from respondents from the constituent groups of actual suppliers and internal customers. Future research could also better define the path between internal customer satisfaction and performance. It might be that the implementation of the practices included in the constructs of management commitment, cross-functional coordination, personnel management, supplier quality management, quality information, and strategic purchasing contributes to improvements in the quality of materials purchased, ensuring on-time delivery from suppliers, meeting material-expending targets, and achieving inventory goals which add to internal customer satisfaction. Such practices might also provide additional value to external customers which would have an

impact on business performance. Subsequent research could establish the contribution that each makes to performance. Despite these areas for future investigation, the study represents a unique contribution by systematically applying and validating the EFQM model to a specific unit (i.e., purchasing).

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APPENDIX 1

Table A1. Quality management key dimensions based on the EFQM model

Quality management dimensions	Description
Leadership	Ability of excellent leaders to develop and facilitate the achievement of the mission and vision by developing organizational values and systems required for sustainable success, as well as implementing these via their actions and behaviors.
Strategy	Captures the organization's efforts to develop a stakeholder-based strategy, taking into account the characteristics of the market and sector in which the firm operates. Thus, policies, plans, objectives, and processes are developed and deployed to deliver the strategy.
People	Workforce management has to be guided by the principles of training, empowerment of workers, and teamwork. Adequate plans of personnel recruitment and training have to be implemented and workers need the necessary skills to participate in the improvement process.
Resources	Efforts of excellent organizations to manage external partnerships, suppliers, and internal resources in order to support policy and strategy and the effective operation of processes.
Process	Captures the efforts of excellent organizations to design, manage, and improve processes in order to fully satisfy and generate increasing value for customers and other stakeholders.